



**flowPIM 1 + PFC**

**600 V / 50 A**

**Features**

- Highly integrated PIM with interleaved PFC circuit
- High switching frequency PFC circuit
- On-board capacitors
- New generation high speed IGBTs in the Inverter

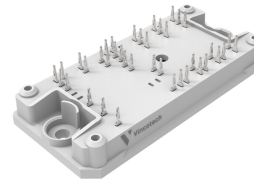
**Target applications**

- Embedded Drives
- Industrial Drives

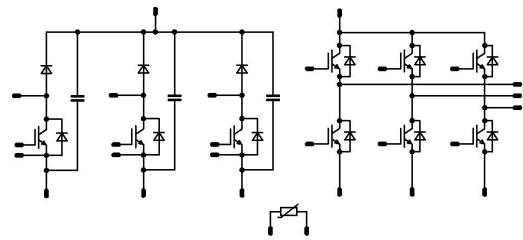
**Types**

- 10-PG06PPA050SJ02-LH94E08T

**flow 1 12 mm housing**



**Schematic**





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**10-PG06PPA050SJ02-LH94E08T**  
target datasheet

## Maximum Ratings

$T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
<b>PFC Switch</b>				
Collector-emitter voltage	$V_{CES}$		650	V
Collector current	$I_C$		30	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	90	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	64	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Maximum junction temperature	$T_{jmax}$		175	°C

## PFC Diode

Peak repetitive reverse voltage	$V_{RRM}$		650	V
Continuous (direct) forward current	$I_F$		30	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	180	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	65	W
Maximum junction temperature	$T_{jmax}$		175	°C

## PFC Sw. Protection Diode

Peak repetitive reverse voltage	$V_{RRM}$		650	V
Continuous (direct) forward current	$I_F$		10	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	20	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	36	W
Maximum junction temperature	$T_{jmax}$		175	°C



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## Maximum Ratings

$T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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### Inverter Switch

Collector-emitter voltage	$V_{CES}$		600	V
Collector current	$I_C$		50	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	88	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Short-circuit ratings	$t_{SC}$	$V_{GE} = 15\text{ V}$ $T_j = 150\text{ °C}$	5	$\mu\text{s}$
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

### Inverter Diode

Peak repetitive reverse voltage	$V_{RRM}$		600	V
Continuous (direct) forward current	$I_F$		30	A
Repetitive peak forward current	$I_{FRM}$	$t_p$ limited by $T_{jmax}$	60	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	56	W
Maximum junction temperature	$T_{jmax}$		175	$^{\circ}\text{C}$

### Capacitor (PFC)

Maximum DC voltage	$V_{MAX}$		630	V
Operation Temperature	$T_{op}$		0 ... 150	$^{\circ}\text{C}$



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## Maximum Ratings

$T_j = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
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### Module Properties

#### Thermal Properties

Storage temperature	$T_{\text{stg}}$		-40...+125	°C
Operation temperature under switching condition	$T_{\text{jop}}$		-40...+( $T_{\text{jmax}}$ - 25)	°C

#### Isolation Properties

Isolation voltage	$V_{\text{isol}}$	DC Test Voltage $t_p = 2\text{ s}$	6000	V
Isolation voltage	$V_{\text{isol}}$	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			>12,7	mm
Clearance			8,05	mm
Comparative Tracking Index	CTI		$\geq 600$	



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target datasheet

### Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		$V_{GE}$ [V] $V_{GS}$ [V]	$V_{CE}$ [V] $V_{DS}$ [V] $V_F$ [V]	$I_C$ [A] $I_D$ [A] $I_F$ [A]	$T_j$ [°C]	Min	Typ	Max		

#### PFC Switch

##### Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0003	25	3,3	4	4,7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	25 125 150 175		1,6 1,8 1,9 1,9	2,22	V
Collector-emitter cut-off current	$I_{CES}$		0	650		25			40	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			120	nA
Input capacitance	$C_{ies}$	f = 1 Mhz	0	25		25		2100		pF
Reverse transfer capacitance	$C_{res}$							7,7		pF
Gate charge	$Q_g$	$V_{CC} = 520$ V	15		30	25		65		nC

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,48		K/W
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#### PFC Diode

##### Static

Forward voltage	$V_F$				0	25 175		1,7	2,6	V
Reverse leakage current	$I_R$			650		25			10	μA

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,45		K/W
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target datasheet

### Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		$V_{GS}$ [V]	$V_{GE}$ [V]	$V_{DS}$ [V]	$I_C$ [A]	$T_j$ [°C]	Min	Typ	Max	

#### PFC Sw. Protection Diode

##### Static

Forward voltage	$V_F$				10	25	1,23	1,55	1,87	V
Reverse leakage current	$I_R$			650		25			0,14	$\mu$ A

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,64		K/W
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#### Inverter Switch

##### Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0008	25	4,1	5,1	5,7	V
Collector-emitter saturation voltage	$V_{CEsat}$		15		50	25 175		1,6 1,94	1,8	V
Collector-emitter cut-off current	$I_{CES}$		0	600		25			2,8	$\mu$ A
Gate-emitter leakage current	$I_{GES}$		20	0		25			100	nA
Input capacitance	$C_{ies}$	f = 1 Mhz	0	25		25		1950		pF
Reverse transfer capacitance	$C_{res}$							67		pF

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,08		K/W
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#### Inverter Diode

##### Static

Forward voltage	$V_F$				30	25	1,25	1,6	1,95	V
Reverse leakage current	$I_R$			600		25			27	$\mu$ A

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,7		K/W
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### Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		$V_{GS}$ [V]	$V_{GE}$ [V]	$V_{DS}$ [V]	$V_F$ [V]	$I_D$ [A] $I_F$ [A]	$T_j$ [°C]	Min	Typ	

#### Capacitor (PFC)

##### Static

Capacitance	$C$							33		nF
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#### Thermistor

##### Static

Rated resistance	$R$					25		22		kΩ
Deviation of $R_{100}$	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	$P$							5		mW
Power dissipation constant	$d$					25		1,5		mW/K
B-value	$B_{(25/50)}$					25		3962		K
B-value	$B_{(25/100)}$					25		4000		K
Vincotech Thermistor Reference									I	

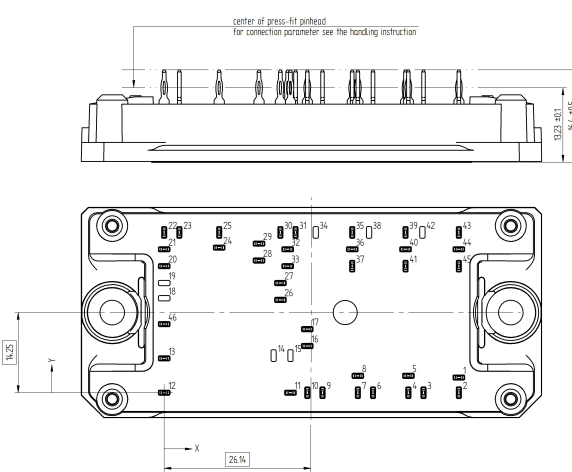


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**10-PG06PPA050SJ02-LH94E08T**  
target datasheet

Ordering Code & Marking									
<b>Version</b>				<b>Ordering Code</b>					
without thermal paste 12mm housing with Press-fit pins				10-PG06PPA050SJ02-LH94E08T					
NN-NNNNNNNNNNNNNN TTTTIV WWYY UL VIN LLLLL SSSS			<b>Text</b>	<b>Name</b>	<b>Date code</b>	<b>UL &amp; VIN</b>	<b>Lot</b>	<b>Serial</b>	
			<b>Datamatrix</b>	<b>Type&amp;Ver</b>	<b>Lot number</b>	<b>Serial</b>	<b>Date code</b>		
				TTTTTTIV	LLLLL	SSSS	WWYY		

Outline							
<b>Pin table [mm]</b>				<b>Pin</b>	<b>X</b>	<b>Y</b>	<b>Function</b>
Pin	X	Y	Function	24	9,8	25,8	PFC+
1	52,5	2,7	DC+Inv	25	9,8	28,5	PFC+
2	52,5	0	DC+Inv	26	20,7	16,5	S27
3	46,2	0	Ph3	27	20,7	19,5	G27
4	43,5	0	Ph3	28	16,9	23,5	PFC-2
5	43,5	3	G16	29	16,9	26,5	PFC-2
6	37,2	0	Ph2	30	20,7	28,5	PFC-1
7	34,5	0	Ph2	31	23,4	28,5	PFC-1
8	34,5	3	G14	32	22	25,5	Therm1
9	28,2	0	Ph1	33	22	22,5	Therm2
10	25,5	0	Ph1	34	not assembled		
11	22,5	0	G12	35	33,5	28,5	DC-1
12	0	0	PFC1	36	33,5	25,5	DC-1
13	0	6,1	PFC2	37	33,5	22,5	G11
14	not assembled			38	not assembled		
15	not assembled			39	43	28,5	DC-2
16	25,5	8,3	S25	40	43	25,5	DC-2
17	25,5	11,3	G25	41	43	22,5	G13
18	not assembled			42	not assembled		
19	not assembled			43	52,5	28,5	DC-3
20	0	22,5	G29	44	52,5	25,5	DC-3
21	0	25,5	S29	45	52,5	22,5	G15
22	0	28,5	PFC-3	46	0	12,2	PFC3
23	2,7	28,5	PFC-3				



center of press-fit pinhead  
for connection parameter see the handling instruction

0,2 ± 0,1  
0,4 ± 0,15

0,25

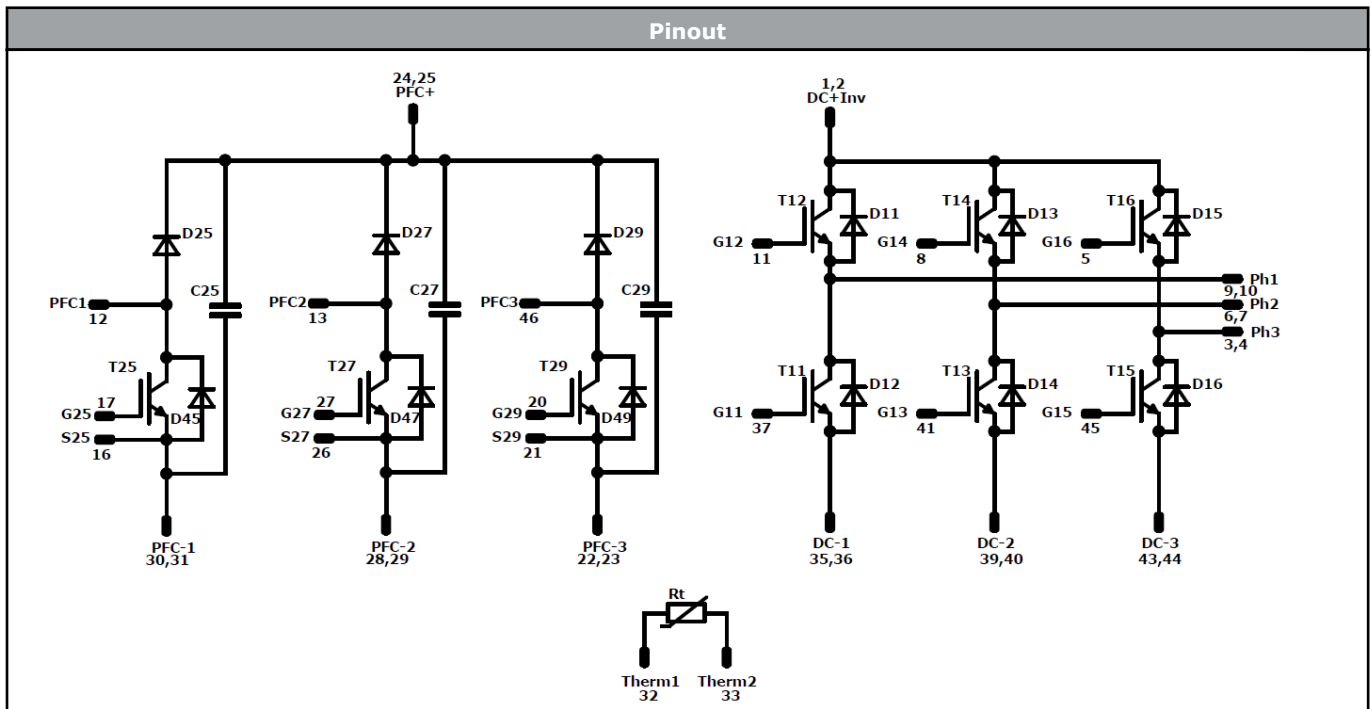
26,9

Tolerance of pinpositions ±0,4mm at the end of pins  
Dimension of coordinate axis is only offset without tolerance





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Identification					
ID	Component	Voltage	Current	Function	Comment
T25, T27, T29	IGBT	650 V	30 A	PFC Switch	
D25, D27, D29	FWD	650 V	30 A	PFC Diode	
D45, D47, D49	FWD	650 V	10 A	PFC Sw. Protection Diode	
T11, T12, T13, T14, T15, T16	IGBT	600 V	50 A	Inverter Switch	
D11, D12, D14, D15, D16, D13	FWD	600 V	30 A	Inverter Diode	
C25, C27, C29	Capacitor	630 V		Capacitor (PFC)	
Rt	Thermistor			Thermistor	




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Packaging instruction				
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for <i>flow 1</i> packages see vincotech.com website.

Package data
Packaging data for <i>flow 1</i> packages see vincotech.com website.

UL recognition and file number
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website. 

Document No.:	Date:	Modification:	Pages
10-PG06PPA050SJ02-LH94E08T-T1-14	25 Sep. 2018	Initial Release	

Product status definition		
Datasheet Status	Product Status	Definition
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.

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